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## CLAIMS

*Claims for  
conflicting  
prior art*

What is claimed is:

1. An aqueous-based ethylene-vinyl acetate polymer emulsion suited for use in  
5 heat seal applications said ethylene-vinyl acetate polymer comprised of crystalline  
ethylene segments prepared by emulsion polymerizing ethylene and vinyl acetate in the  
presence of a stabilizing system consisting essentially of a surfactant or a cellulosic  
protective colloid in combination with a surfactant, said ethylene-vinyl acetate polymer  
having:
  - 10 (a) a crystalline melting point ranging from 35 to 110 °C measured at a heat  
rate of 20 °C per minute; and,
  - (b) a tensile storage modulus of at least  $1 \times 10^5$  dynes/cm<sup>2</sup> at a temperature  
of 115 °C and measured at 6.28 rad/sec.
- 15 2. The polymer emulsion of claim 1 wherein the polymer is comprised of from 15  
to 90% by weight of polymerized units of vinyl acetate and from about 10 to 85% by  
weight of polymerized units of ethylene based upon the total weight of the polymer.
- 20 3. The polymer emulsion of claim 1 wherein the polymer is comprised of from 25  
to 80% by weight of polymerized units of vinyl acetate and from about 20 to 75% by  
weight of polymerized units of ethylene based upon the total weight of the polymer.
- 25 4. The polymer emulsion of claim 1 wherein the polymer is comprised of from 35  
to 75% by weight of polymerized units of vinyl acetate and from about 25 to 65% by  
weight of polymerized units of ethylene based upon the total weight of the polymer.
- 30 5. The polymer emulsion of claim 1 wherein the polymer is comprised of from 30  
to 50% by weight of polymerized units of vinyl acetate and from about 50 to 70% by  
weight of polymerized units of ethylene based upon the total weight of the polymer.
6. The polymer emulsion of claim 2 wherein polymerized carboxylic acid units  
are present in said polymer in an amount from about 0.2 to about 10% by weight of said  
polymer.

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7. The polymer emulsion of claim 6 wherein said polymer has a tensile storage modulus of at least  $2 \times 10^5$  dynes/cm<sup>2</sup> at 115 °C and measured at 6.28 rad/sec.

5           8. The polymer emulsion of claim 7 wherein the polymer is comprised of polymerized units of ethylene, vinyl acetate, and acrylic acid.

9. The polymer emulsion of claim 7 wherein the crystalline heat of fusion of said polymer is from about 5 to 100 joules per gram as measured at a heat rate of 20 °C per  
10 minute.

10. The polymer emulsion of claim 7 wherein the glass transition temperature is from +25 °C to about -35 °C as measured at a heat rate of 20 °C per minute.

15           11. The polymer emulsion of claim 8 wherein crystalline thermal melting point ranges from 50 to 90 °C as measured at a heat rate of 20 °C per minute.

12. The polymer emulsion of claim 8 wherein a portion of the emulsion polymerization is carried out at a pressure of from 1000 to 2000 psig (6,996 to 13,891  
20 kPa).

13. The polymer emulsion of claim 12 wherein the stabilizing system consists essentially of hydroxyethyl cellulose in combination with a surfactant.

25           14. The polymer emulsion of claim 13 wherein the vinyl acetate is present in an amount from 15 to 90% by weight, the ethylene is present in an amount from 10 to 85% by weight, and the acrylic acid is present in an amount from 0.5 to 5% by weight of the polymer.

30           15. The polymer emulsion of claim 14 wherein the crystalline heat of fusion ranges from preferably 15 to 70 joules per gram as measured at a heat rate of 20 °C per minute.

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16. A process for making an aqueous-based semi-crystalline ethylene vinyl acetate polymer emulsion which comprises reacting vinyl acetate and ethylene with optionally one or more other ethylenically unsaturated monomer, under emulsion polymerization conditions in the presence of a stabilizing system consisting essentially of a surfactant or a cellulosic protective colloid in combination with a surfactant, said ethylene-vinyl acetate polymer having:

(a) a crystalline melting point ranging from 35 to 110 °C measured at a heat rate of 20 °C per minute; and,

(b) a tensile storage modulus of at least  $1 \times 10^5$  dynes/cm<sup>2</sup> at a temperature of 115 °C and measured at 6.28 rad/sec.

17. The process of claim 16 wherein the addition of monomers, except ethylene, to the emulsion polymerization are completed within the first 75% of the total reaction time.

18. The process of claim 16 wherein a portion of the process is carried out at pressures of from 1000 to 2000 psig (6,996 to 13,891 kPa).

19. A process for forming a paper stock for heat seal application which comprises:

coating a paper substrate with a polymer emulsion comprising emulsion polymerized units of vinyl acetate and ethylene with one or more other ethylenically unsaturated monomer, wherein said polymer emulsion is stabilized with a stabilizing system consisting essentially of a surfactant or a cellulosic protective colloid in combination with a surfactant, said polymer containing crystalline ethylene segments and having (a) a crystalline melting point ranging from 35 to 110 °C as measured at a heat rate of 20 °C per minute; and, (b) a tensile storage modulus of at least  $1 \times 10^5$  dynes/cm<sup>2</sup> at a temperature of 115 °C and measured at 6.28 rad/sec; and then,

drying the coating, said dried coating being non-blocking at ambient temperature.

20. A multi-layer heat sealable material comprising

(a) at least one substrate; and

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- 5 (b) at least one coating of a polymer emulsion comprising emulsion polymerized units of vinyl acetate and ethylene with one or more other ethylenically unsaturated monomer, wherein said polymer emulsion is stabilized with a stabilizing system consisting essentially of surfactant or a cellulosic protective colloid in combination with surfactant, said polymer containing crystalline ethylene segments and having (a) a crystalline melting point ranging from 35 to 110 °C measured at a heat rate of 20 °C per minute; and, (b) a tensile storage modulus of at least  $1 \times 10^5$  dynes/cm<sup>2</sup> at a temperature of 115 °C and measured at 6.28 rad/sec.